

and Bihar. It grows in cultivated fields on high hills (910-1220 m) of Kalahandi, Gajpati and Ganjam districts of Orissa. The detailed description of the taxon is available in the literature, hence the present notes only deal with its correct nomenclature, distribution and ecology. An illustration is also provided. The voucher specimens are deposited in the herbarium, Bhagalpur University. The identification of the specimens have been confirmed at the Central National Herbarium (CAL).

Eragrostis aspera (Jacq.) Nees, Fl. Afr. Austr. 468. 1841; Hooker, Fl. Brit. Ind. 7: 314. 1896; Bor, Gr. Burma, Ceylon, Ind. & Pak. 501. 1960.

The plant frequently grows in gravelly soils in shifting cultivation fields (Bogoda or Poda, Oriya) on

hills.

Distribution: INDIA: Bihar, Rajasthan, Western India and South India; Africa, Mascarene Islands.

Flowers: August-December.

Specimens examined: Nijamaska (1065 m), Thaumal Rampur block, Kalahandi district, Jha 5TR; Gangabad, Koinpur, Gajpati district, 975 m, Jha 21K; Marmalia, Thumba, Ganjam district, 975 m, Jha 8T; Kathpatani, Rudhapadar, Ganjam district, Jha 12R.

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R.R. JHA

Badlao Foundation,
Mihijam, Dumka 815 354,
Bihar.

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39. STUDIES ON THE SPORE MORPHOLOGY OF *OLEANDRA UNDULATA* (WILLD.) CHING AND *O. WALLICHII* (HOOK.) PRESL.

(With a plate)

INTRODUCTION

Recently, some of the important contributions on the spore morphology of ferns and fern-allies were made by Erdtman and Sorsa (1971); Wilce (1972), Wagner (1974), Mitui (1977), Lugardon (1978), Tryon and Tryon (1982) and others. In India some of the contributions were provided by Nayar (1964), Joshi (1966-67), Devi (1973, 1977, 1981), Verma and Khullar (1978), Bir and Bhusri (1985), etc.

However, the family Oleandraceae received little attention in the context of spore morphological studies (Braggio 1966, Devi and Nayar 1971, Liew 1977, Harmata and Kornas 1978). This communication aims to present comparative spore structures of *O. undulata* and *O. wallichii*.

MATERIAL AND METHODS

The spore samples were collected from herbarium specimens and were treated by the

acetolysis technique (Erdtman 1952). The terminology, namely exine processes, ornamentation, stratification and laesural features were followed after Erdtman *et al.* (1961).

The descriptions are based on light microscopic observations and in case of *O. undulata*, spores were also examined under Scanning Electron Microscope. The magnification of the photographs has been indicated in the figures.

OBSERVATIONS

Oleandra undulata (Willd.) Ching, Lingnan Sci. J. 12: 565. 1933. *O. cumingii* J. Smith, Hook. Sp. Fil. IV. 158.

The specimens were collected from a dense *Quercus* forest, at an elevation of 2100 m.a.s.l., growing as lithophytes on exposed, rocky walls or as epiphytes on *Quercus* tree trunks. The plant is rare in its occurrence in Garhwal Himalaya (GUH- 12103).

Spores monolete, bilateral, $23.8 \times 32.5 \mu$ ($21-24.5 \times 29.8-34.7 \mu$) plano-convex to slightly concavo-convex in lateral view and oblong to elliptic in polar view. Laesura 18.1μ long, tenuimarginate. Exine 2.4μ thick, brown, densely spinulose bearing dark brown, sharp-pointed, short spinules about 1.9μ tall. Perine deep brown, surface under the SEM densely spinulose bearing slender, sharp spinules with sharp pointed apices, about 2.1μ tall (In L.M. observations). Perine adhering to the exine and folded into elongated, irregular, thin (sometimes scarcely sinuous) folds coalesced to form an irregular lophate pattern with crenate crests and protruding up to 5.1μ from the exine surface (Plate 1, Figs. 1-4).

O. wallichii (Hook.) Presl, Tent. Pterid. 78. 1836.

The specimens were collected from a moist, shaded forest at an elevation of 2000 m.a.s.l., growing on damp rock surfaces or as epiphyte on *Rhododendron* tree trunks. This species is also rare in its occurrence in Garhwal Himalaya (GUH-12065).

Spores monolete, bilateral, $26.3 \times 36.8 \mu$ ($24.5 - 28 \times 35 - 38.5 \mu$), plano-convex to slightly concavo-convex in lateral view and oblong to elliptic in polar view. Laesura 17.5μ long, tenuimarginate. Exine 2.2μ thick, brown, spinulose with short, sharp-pointed, sparse spinules about 2.2μ tall. Perine dark brown, densely spinulose with spinules up to 4.2μ tall with sharp pointed spines, closely adhering to the exine and folded into crowded, elongated, thin, irregular folds coalesced forming a reticulate pattern with irregular reticulations on the surface and protruding up to 3.6μ from the exine surface with irregular, crenate crest (Plate 1, Figs. 5-6).

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DISCUSSION

Oleandra undulata and *O. wallichii* represented almost similar type of spore morphology (monolete and bilateral), the perine is densely spinulose, however, the former bears small spinules up to 2.1μ tall while in the latter, spinules are about 4.2μ tall on the perine folds. *O. undulata* perine folds are coalesced to form an irregular lophate pattern and protruding up to 5.1μ , whereas *O. wallichii* perine folds are coalesced giving a reticulate pattern and protrude up to 3.6μ from the exine surface.

In general, the spores of *Oleandra* are uniformly echinate and bear wing like folds (Braggio 1966, Liew 1977, Harmata and Kornas 1978, Tryon and Tryon 1982) and most of the palynologists treated their resemblance with the Dryopteroid rather than Davalloid ferns. However, the echinate processes are quite prominent in *O. wallichii* and the perine folds are either coalesced to form an irregular lophate pattern (*O. undulata*) or reticulate pattern (*O. wallichii*).

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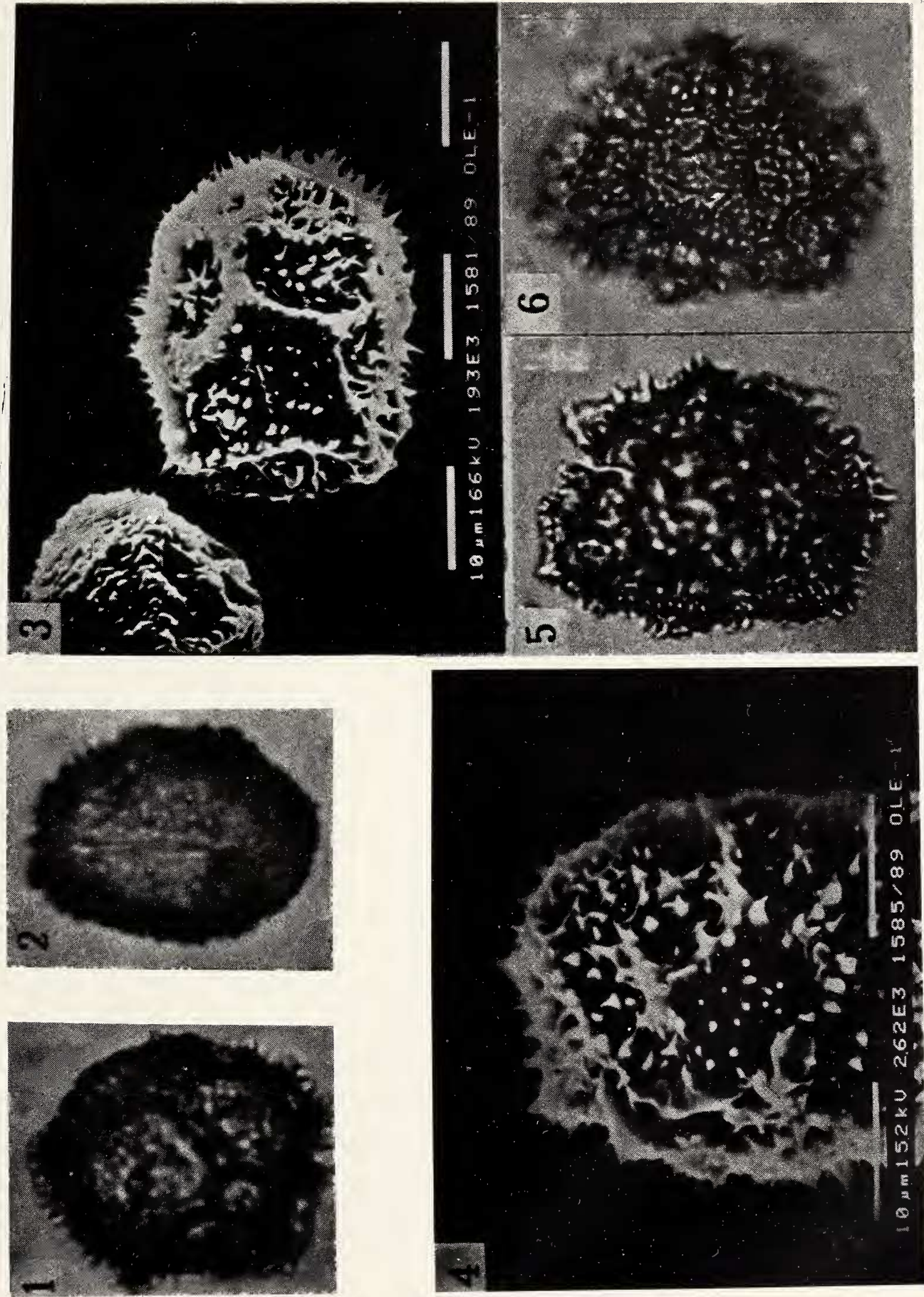
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PREETI PAINULI
R.D. GAUR

Department of Botany,
H.N.B. Garhwal University,
Srinagar, Garhwal 246 174,
U.P.

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Figs. 1-4. *Oleandra undulata* — (L.M Figs.) 1. perine folds; 2. laesura (x 1000). (SEM Figs.) 3. perine folds with spinules (x 1930); 4. magnified view of perine surface indicating spinules (x 2620).

Figs. 5-6. *Oleandra wallichii* — (L.M Figs.) 5. spinulose perine; 6. perine folds and surface pattern (x 1000, unacetolysed).